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KAM-PaY: Closed Wallet with SQL-Technology and Biometric Authentication

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Abstract

Closed Wallet is a novel database collection system designed to securely gather and manage user data using SQL technology. This system addresses the growing concern for data privacy and security by implementing robust authentication methods and access controls. Through SQL queries, Closed Wallet efficiently retrieves and stores user information while adhering to stringent privacy regulations. The proposed KAM-Pay (Kamaraj payment), an implementation of the closed e-wallet system for the college canteen in Kamaraj Engineering college, is being developed using Visual Studio. Furthermore, the biometric authentication in proposed work ensures the data integrity and confidentiality, safeguarding sensitive information from unauthorized access.

Keywords: Digital Payment, Security, E-Wallet, Finger Print Sensor, Visual Studio

1. Introduction

Our Closed Wallet solution offers unparalleled protection by securely storing client data collected through SQL databases. With robust authentication measures, our platform ensures the utmost confidentiality, enabling users to manage their finances with peace of

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mind[9]. Experience seamless transactions and safeguarded information like never before with our Closed Wallet system. Additionally, we've implemented a biometric sensor (a fingerprint sensor) to identify the person whose identity was already stored in the database. By using this process, the payment process from the client has been done securely and successfully[1-5].

2. Problem Statement

Today's technology world sees the rise of various communication technologies and electronic payment systems, transforming how transactions happen globally. One such innovation is the electronic wallet, often called an E-Wallet, which enables digital payments through electronic devices. Given the convenience of E-Wallets in daily activities, we're proposing a closed wallet system for our college canteen. This system incorporates biometric authentication to uphold data integrity and confidentiality, protecting sensitive information from unauthorized access[6-8]

3. Proposed Work

The proposed system is a closed wallet for the college canteen. When students or staff registered in the database deposit funds, these funds are converted into points. These points can then be used to purchase products whose prices are within the allocated points. As purchases are made, points are deducted accordingly, and the remaining points are stored in the database. Details of the daily transactions are recorded in a separate column called 'history,' as shown in Figure 5. Additionally, the system incorporates biometric authentication to ensure data integrity and confidentiality, protecting sensitive information from unauthorized access. The Figure.1 below shows the flowchart of the proposed work.

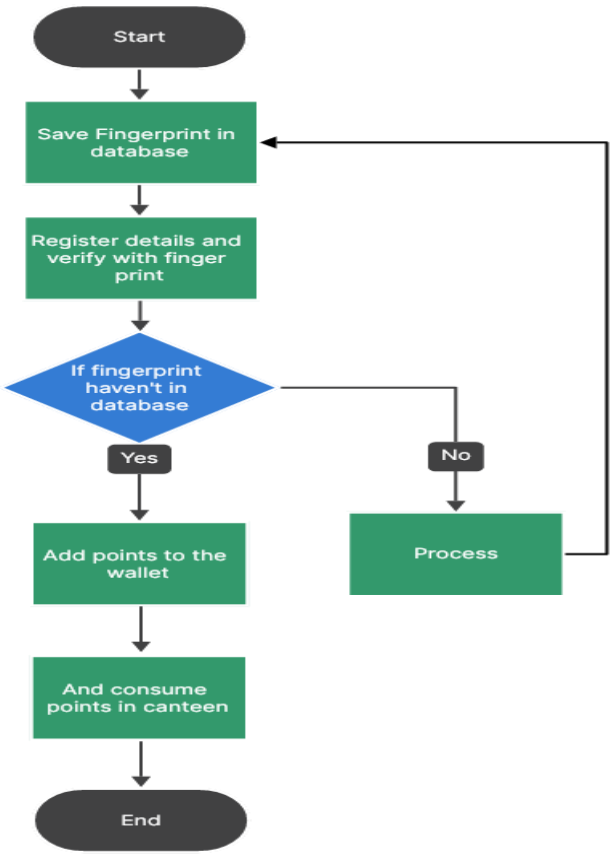


Figure 1. Methodology

The table.1 shows the hardware's and the software's used in the proposed system.

Table 1. Hardware and Software Requirements

Hardware Requirement	Software Requirement
4GB Ram Intel Core i3	Microsoft Visual Studio
Arduino	XAMPP Control Panel
Finger Print Sensor	SFG Demo V2.0

3.1 Software Requirements

Microsoft Visual Studio: Used for developing the KAM-PaY software and designing the user interface. It also facilitates the retrieval of user data from both the admin and canteen sides.

XAMPP Control Panel: Utilized for creating a SQL server to store user data and fingerprints in the database.

SFG Demo V2.0: Used for enrolling user fingerprints and storing them in the database with unique addresses. The fingerprints are stored using Arduino.

4. Results and Discussion

The implementation of the closed e-wallet application yielded several significant results, indicating its effectiveness and utility and the result was shown in Figure 2 to 9. The advantages of the proposed system are as follows.

1.Improved Convenience: Users experienced enhanced convenience in making payments for various goods and services. With the e-wallet application, they could easily carry out transactions without the need for physical cash, streamlining the payment process.

2.Enhanced Security: The closed e-wallet application ensured robust security measures, safeguarding users' financial information and transactional data. Authentication mechanisms, encryption protocols, and secure servers were implemented to protect against unauthorized access and fraudulent activities.

3.Cost Savings: By reducing the reliance on physical cash and traditional payment methods, the e-wallet application led to cost savings for both users and business.

4.Adoption Rates: Analyzing the adoption rates of e-wallets among different demographic groups and regions sheds light on their popularity and potential for further growth. Factors influencing adoption include smartphone penetration, internet connectivity, and trust in digital payment systems.

5. Financial Inclusion: Assessing the role of e-wallets in promoting financial inclusion is crucial. While they offer convenient access to financial services for unbanked or under banked populations, challenges such as digital literacy, infrastructure limitations, and regulatory barriers need to be addressed.

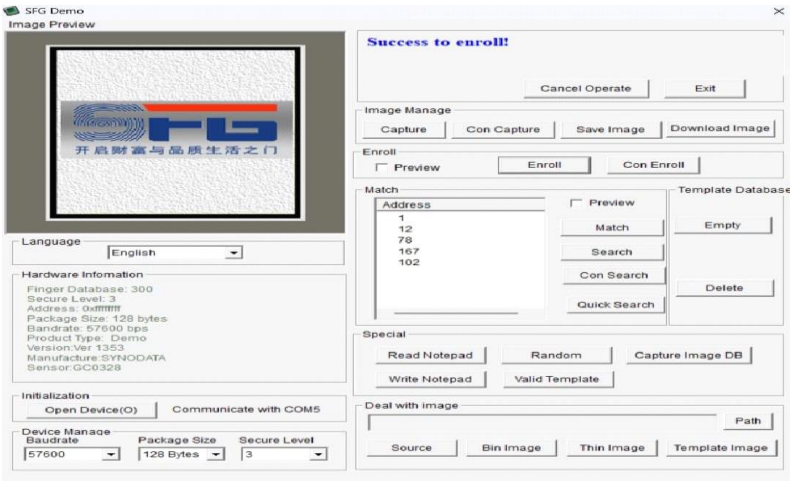


Figure 2. Enroll page

To enroll the fingerprint with unique address and save it in the database.

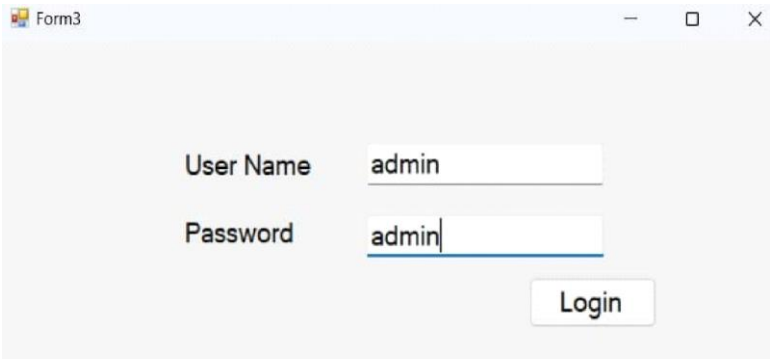


Figure 3. Login Page

Login into the KAM-PaY software using this username and password.

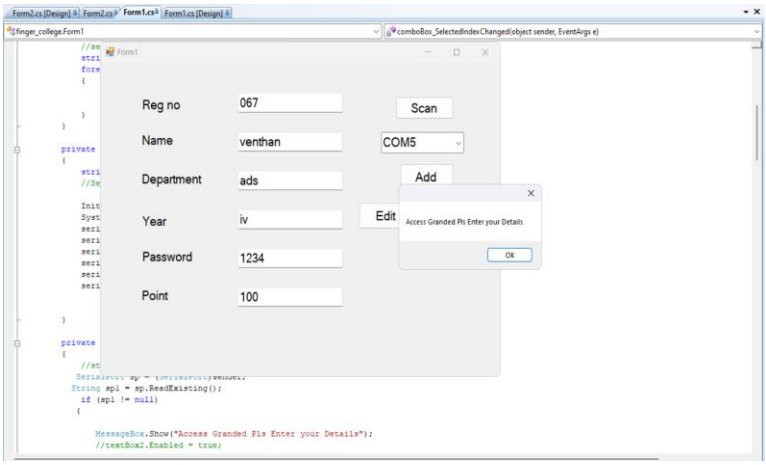


Figure 4. User Register

To register the users with registration number (RegNo) and give how many points they purchased using the enrolled fingerprint for security purpose.

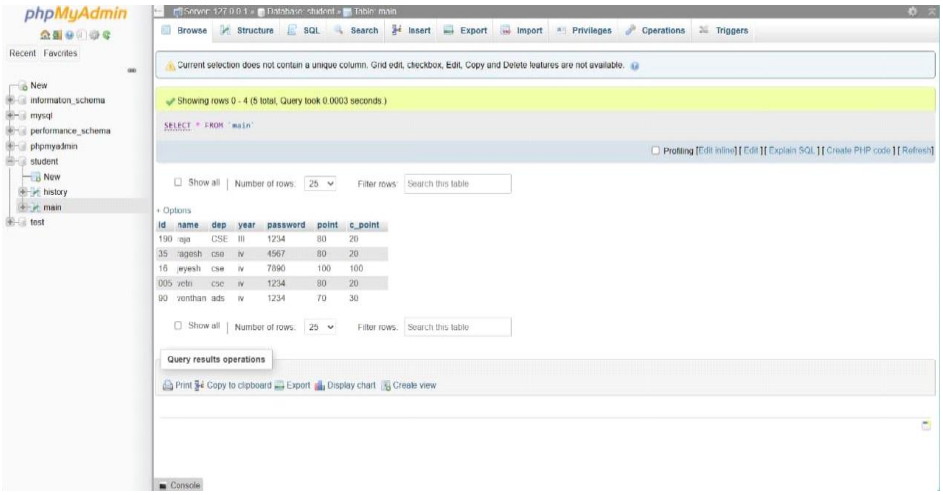


Figure 5. Registered Students Database

Registered student database including details like purchased and consumed points.

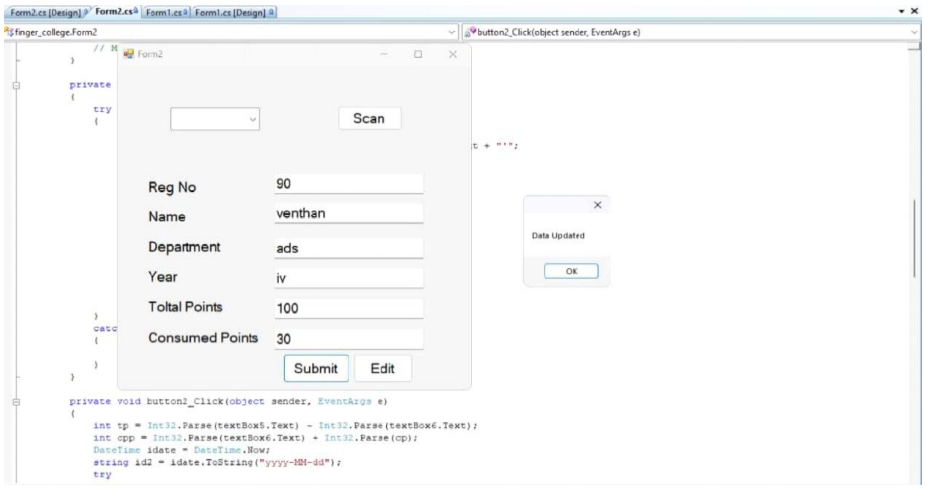
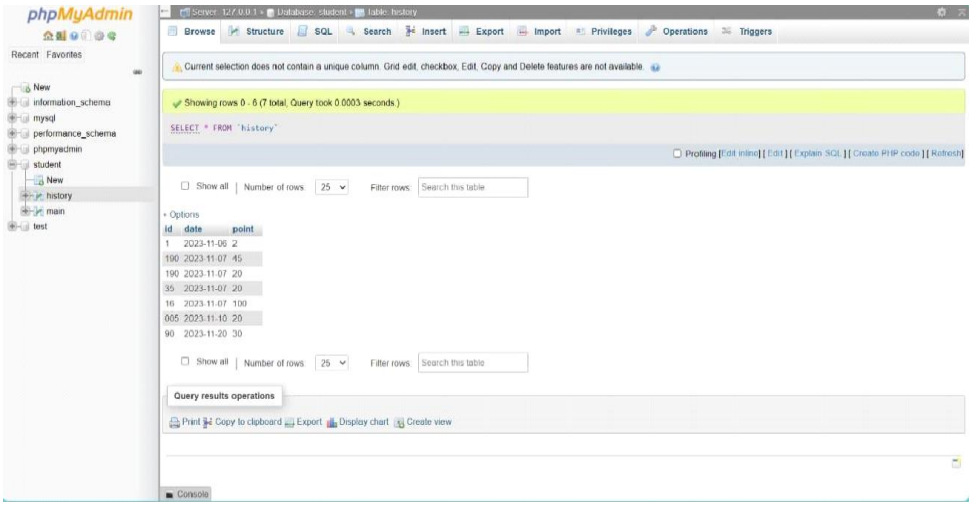


Figure 6. Consumed Points

This is about how to consume the user's points when they buy things in canteen.



The users consumed points history with id,date and how much they consumed

Figure 7. Consumed Points Data

Figure 8. App Login

This application is used to login with user Regno and password to see the history of points spent.

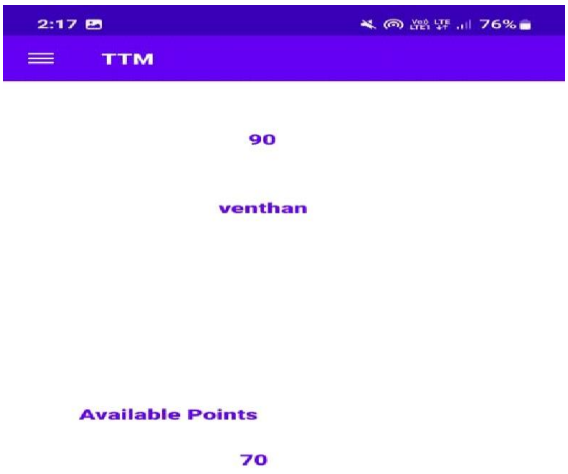


Figure 9. History of Users Consumed Points

After login with user credentials, it shows the available and consumed points.

5. Conclusion

In conclusion, the implementation of the closed e-wallet system for the college canteen has proven to be a resounding success. By leveraging technology to streamline payment processes, enhance security, and provide valuable insights, the system has transformed the dining experience for students and staff alike. Moving forward, continuous improvements and innovations can further optimize the system's functionality, ensuring it remains a cornerstone of convenience and efficiency within the college ecosystem.

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